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Mind the M's: A Review of the Implications of Menstruation, Maternity, and Menopause for Work Performance and Attendance

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Mind the M's: A Review of the Implications of Menstruation, Maternity, and Menopause for Work Performance and Attendance*

Abstract

Menstruation, maternity, and menopause, collectively referred to as the three M's, affect many employees as a growing number of women participate in the labour force. However, their implications for these women's working lives have received limited and fragmented attention in the literature. This study therefore provides the first systematic literature review integrating evidence on the impact of the three M's on work performance and attendance. Following the SPIDER framework and PRISMA guidelines, this study systematically reviews 57 articles. Across all three M's, findings consistently show reduced work performance, increased presenteeism, and higher absenteeism, explained by interacting biological, psychological, and contextual factors. This study also identifies important limitations in the existing literature, including the dominance of cross-sectional designs, the reliance on subjective measures, and the lack of attention to workplace solutions that address the three M's collectively.

JEL classification

J16, J24, J22, J28

Keywords

menstruation, maternity, menopause, work performance, work attendance

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1. Introduction

Women undergo several reproductive experiences across their life course, each characterised by hormonal changes (Arena et al., 2023; Grandey et al., 2020). Three of these reproductive experiences stand out, i.e., menstruation, maternity, and menopause, collectively referred to as the three M's (Cicchetti et al., 2026; Grandey et al., 2020), as these are particularly salient across the female reproductive life course (Cicchetti et al., 2026). Consequently, these three experiences are also particularly relevant in the context of work because they affect many women during their years of professional employment and may influence their work experiences and outcomes (Atkinson et al., 2021; Cicchetti et al., 2026; Cook & van den Hoek, 2023; Geukes et al., 2012; Grandey et al., 2020; Li et al., 2023; Safwan et al., 2024; Schoep et al., 2019; Xu et al., 2021). To illustrate, employees may navigate menstrual discomfort, combine work with breastfeeding, or experience menopausal symptoms at work (Grandey et al., 2020).

Although nearly half of women worldwide are economically active (The World Bank Group, 2024), insufficient attention has been paid in the existing literature to how these reproductive experiences affect working life (Anderson & Rutherford, 2012; Gatrell, 2011b; Grandey et al., 2020; Jack et al., 2016; Ryan et al., 2006; Safwan et al., 2024). One explanation for this lack of attention is offered by feminist theory, which argues that workplaces are historically structured around an implicit assumption of an ideal worker assumed to have a body unaffected by reproductive experiences (Acker, 1990; Grandey et al., 2020). As a result, women's reproductive experiences may be stigmatised as deviations from this norm, prompting concealment and potentially affecting women's work performance and attendance (Goffman, 1963; Grandey et al., 2020).

To advance the limited and fragmented literature on the impact of the three M's on working life, this study conducts a systematic literature review examining the impact of the three M's on the work performance and work attendance of employed women. We focus on work performance, as the three M's are associated with consequences that are often negative, causing discomfort that, in some cases, may not necessarily require absence from work but may nevertheless impair work performance (e.g., Cook & van den Hoek, 2023; Gatrell, 2011a; Geukes et al., 2012; Grandey et al., 2020). In addition to their direct impact

on work performance, we also consider absenteeism (i.e., absence from work) and presenteeism (i.e., working despite symptoms that could justify sick leave) as, in other cases, the consequences of the three M's are of such a nature that they justify absence from work (e.g., Cook & van den Hoek, 2023; Gatrell, 2011a; Geukes et al., 2012; Guidetti et al., 2022; Leon-Larios et al., 2024).[1]

Considering absenteeism and presenteeism alongside the direct impact on work performance provides a more comprehensive understanding of how the three M's affect women's functioning at work. More specifically, both absenteeism and presenteeism are considered important indicators of productivity loss (Aboagye et al., 2019; Bycio, 1992). Presenteeism can contribute to higher long-term healthcare costs for employers, poorer health outcomes for employees, and diminished work quality among both the affected individual and their colleagues (De Arruda et al., 2024). Kinman (2019) confirms that presenteeism can exacerbate existing health problems and increase the risk of subsequent illness and absence.

Just as considering these multiple work outcomes provides a more comprehensive understanding, it is also important to study the three M's in conjunction rather than in isolation (Cicchetti et al., 2026). Yet most review studies focus on only one of the three M's (e.g., Arena et al., 2023; Franzoi et al., 2024; Gatrell, 2011b; Safwan et al., 2024; Verdonk et al., 2022). The review of Howe et al. (2023) also does not consider all three M's, as the authors include menstruation and menopause but do not include maternity. This fragmented perspective is problematic, as the shared characteristics between the three

[1] Varying definitions of presenteeism are employed in the literature. Some researchers define it as working despite not feeling 100% (e.g., Hardy & Hunter, 2021), others as working while being ill (e.g., Gatrell, 2011a), and still others as working despite not functioning at full capacity due to symptoms (e.g., De Arruda et al., 2024). These definitions differ along two key dimensions. First, the required severity of symptoms varies: in some cases, symptoms must be severe (e.g., illness or significant pain), whereas in others, not feeling entirely well suffices, which can be caused by milder symptoms. Second, some definitions explicitly incorporate a link to productivity, while others do not. In the present study, we adopt the definition of presenteeism as working despite symptoms that could justify sick leave. We deliberately distinguish between the concepts of presenteeism and work performance in order to avoid conceptual overlap. This distinction implies that work performance may be affected in the absence of presenteeism. For example, an employee experiencing hot flushes may not consider themselves ill, yet their symptoms may still impair certain tasks or their performance at specific moments. Conversely, presenteeism may occur without a measurable impact on work performance: an individual may feel sick, but still be sufficiently capable of performing their job.

experiences may provide important insights that separate research does not offer. This not only leads to a better understanding of the three M's, but also to more effective and integrated solutions for work-related challenges. By examining multiple reproductive life course experiences together, integrated solutions to problems can be identified (Howe et al., 2023). In fact, policies targeting only one reproductive experience may be insufficient and may even create unintended negative consequences. For instance, menopause-specific workplace policies may reinforce stigma and perceptions of reduced capability among older female workers (Carter et al., 2021). This suggests that workplace interventions should adopt a more integrated perspective that addresses women's reproductive experiences more broadly, rather than focusing on a single life course experience in isolation (Grandey et al., 2020; Howe et al., 2023).

Only a limited number of reviews have considered the three M's jointly. However, they address different research questions. Grandey et al. (2020) were among the first to provide a broad conceptual review of menstruation, maternity and menopause in the workplace. Yet their review is narrative in nature rather than systematic and has a broad conceptual scope rather than a specific focus on work performance and work attendance. More recently, Cicchetti et al. (2026) conducted the first systematic literature review examining all three M's jointly, but they focused on workplace stigma, discrimination, and taboo. Therefore, to our knowledge, the present study is the first systematic literature review to synthesise the evidence on the impact of the three M's specifically on employed women's work performance and work attendance.

Guided by this aim, we address three research questions. First, to what extent do the three M's influence the work performance and work attendance of employed women (RQ1)? Second, how do the three M's influence the work performance and work attendance of employed women (RQ2)? Third, what workplace-relevant solutions are proposed in the literature addressing the influence of the three M's on work performance and work attendance of employed women (RQ3)?

The remainder of this article is structured as follows. Section 2 provides background context for this systematic literature review by first providing more details on the menstrual cycle, maternity, and the menopausal transition. Section 3 outlines the methodological approach used in this review. Section 4 then presents the findings regarding the effects of

the three M's on work performance and work attendance and their underlying explanations, followed by a discussion of the proposed solutions in this literature to their (negative) consequences. Finally, Section 5 concludes the study and provides directions for future research.

2. Background on the three M's

This study focuses on the impact of the menstrual cycle, maternity, and the menopausal transition (in the next sections often referred to as menstruation, maternity, and menopause for brevity and consistency with the literature) on the work performance and work attendance of employed women. In this section, more details are provided on these three reproductive life course experiences.

The first 'M' refers to the menstrual cycle, a recurring hormonal process during which women's bodies prepare for a potential pregnancy (Hillard, 2008; Schmalenberger et al., 2021; Thiyagarajan et al., 2024). The menstrual cycle occurs throughout the reproductive years until menopause is reached (Schmalenberger et al., 2021; Thiyagarajan et al., 2024). It consists of several phases characterised by hormonal changes. The first phase is the follicular phase which begins with menstrual bleeding, that typically lasts between two and seven days, and continues until ovulation (Hillard, 2008; Thiyagarajan et al., 2024). In this study, the period of menstrual bleeding is referred to as the menstrual phase. The follicular phase is followed by ovulation, a brief second phase during which an oocyte is released (Thiyagarajan et al., 2024). Third and last is the luteal phase, which lasts approximately 14 days and is sometimes subdivided into early, mid-, and late luteal stages (Reed & Carr, 2018; Schmalenberger et al., 2021; Xu et al., 2022). After the luteal phase, the cycle repeats itself and a new follicular phase begins, characterised by the start of a new round of menstrual bleeding (Thiyagarajan et al., 2024). Finally, it is important to note that hormonal contraception alters the natural menstrual cycle by suppressing ovulation-related hormonal fluctuations and may reduce menstrual symptoms such as pain and bleeding (e.g., Schmalenberger et al., 2021; Fooladi et al., 2023).

The second 'M' refers to maternity. Following fertilisation, the menstrual cycle ceases

and pregnancy begins (Schmalenberger et al., 2021; Thiyagarajan et al., 2024). In line with Arena et al. (2023), maternity in this study is defined as encompassing the period from pregnancy (the prenatal period) to the postpartum period, including lactation. The postpartum period refers to the period following childbirth (Grandey et al., 2020). Maternity involves substantial biological and psychological changes that may persist for several months (Grandey et al., 2020). These changes occur both during pregnancy and after childbirth (Gatrell, 2011b). The duration of the postpartum period may vary depending on the length of breastfeeding, as lactation represents an important aspect of the post-birth maternal body (Gatrell, 2011b).

The final 'M' refers to the menopausal transition. The menopausal transition consists of the perimenopause, the menopause, and the postmenopause. Menopause is defined as the point in time marking the permanent cessation of menstruation, confirmed after 12 consecutive months of amenorrhoea, with amenorrhoea referring to the absence of menstruation (Grandey et al., 2020; Oude Hengel et al., 2023; Thiyagarajan et al., 2024). Menopause is preceded by the perimenopause (Grandey et al., 2020; Oude Hengel et al., 2023; Willman & King, 2023). During perimenopause, hormonal levels fluctuate and menstrual cycles become irregular (Grandey et al., 2020; Schmalenberger et al., 2021). Following menopause, in the postmenopause, hormone levels stabilise at lower levels. Although menopausal symptoms are often most pronounced during perimenopause, some symptoms may persist after menopause and may continue to affect daily functioning and work ability, especially in the early postmenopausal stage (Oude Hengel et al., 2023).

In sum, menstrual cycles recur throughout the reproductive years, may be temporarily interrupted by pregnancy and the postpartum period (i.e., maternity), and eventually cease during the menopausal transition. Taken together, these reproductive life course experiences constitute a substantial part of many women's adult lives. As they involve important biological and psychosocial processes, they are highly relevant for understanding women's work performance and work attendance.

3. Data and method

To answer the research questions, a structured approach was adopted, as outlined by Xiao and Watson (2019). This approach consisted of several key components: (i) identifying the review objective (including the research questions) and the review strategy, (ii) selecting the relevant studies, and (iii) extracting and analysing the data. Each component is discussed in turn in the following sections.

3.1 Identification of studies

To identify and evaluate relevant studies, inclusion criteria were developed based on the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, Research type) (Cooke et al., 2012), see Table 1. The Sample criterion included employed women experiencing symptoms related to menstruation, maternity, or menopause.[2] The Phenomenon of Interest criterion focused on the impact of the three M's on the work performance and work attendance of employed women. Regarding the Design criterion, only empirical study designs were included, such as interviews, surveys, focus groups, experiments, and observational studies. Furthermore, the Evaluation criterion comprised outcomes related to work performance and attendance. In line with Bycio (1992), work performance outcomes could be assessed using different types of indicators, such as self-ratings, supervisory ratings, output measures, and quality indices, reflecting both subjective and more objective performance measures. Finally, the Research type criterion focused on primary qualitative and quantitative research, with only original empirical studies included.

<Table 1 about here>

The different search stages consisted of an initial manual search based on keywords

[2] Students were excluded, as they fall outside the employed population. Studies including mixed samples of students and employed women were retained when results were reported jointly and the majority of participants were employed women. Similarly, although the focus is on employed women, studies including both cisgender women and individuals who do not identify as women were included, provided that participants experienced symptoms related to menstruation, maternity, or menopause and that cisgender women constituted the majority of the sample. This approach was adopted to maximise inclusiveness while maintaining relevance to the target population. In addition, elite athletes were excluded because they constitute a specific occupational group with distinct requirements in terms of health management, performance, and professional support.

derived from the research questions and forward and backward citation screening to ensure that no relevant articles were overlooked (see also Section 3.2). Studies published between 2010 and 2024 (with 2024 representing the most recent full calendar year at the time of data collection) in the Web of Science Core Collection that surfaced in the different search stages and that matched the SPIDER criteria were included. Specific research areas from the Web of Science Core Collection were excluded, as they were considered unlikely to yield relevant results.[3]

More specifically, the keywords used in the initial manual search combined three categories: keywords related to (i) the three M's, (ii) the workplace, and (iii) work performance and work attendance.[4] For each of the M's, commonly used keywords were

[3] The following research areas were excluded from the search (with the number of articles per area indicated in parentheses): Agricultural Engineering (1), Agriculture Dairy Animal Science (33), Agriculture Multidisciplinary (6), Agronomy (3), Anesthesiology (2), Anthropology (6), Area Studies (6), Astronomy Astrophysics (1), Audiology Speech Language Pathology (4), Biochemical Research Methods (2), Biotechnology Applied Microbiology (2), Cardiac Cardiovascular Systems (1), Cell Biology (5), Chemistry Analytical (2), Chemistry Applied (1), Chemistry Multidisciplinary (2), Chemistry Biological (2), Computer Science Artificial Intelligence (2), Computer Science Cybernetics (2), Computer Science Hardware Architecture (1), Computer Science Information Systems (6), Computer Science Interdisciplinary Applications (5), Computer Science Theory Methods (3), Construction Building Technology (3), Criminology Penology (1), Critical Care Medicine (1), Dentistry Oral Surgery Medicine (1), Dermatology (1), Ecology (4), Education Special (1), Energy Fuels (1), Engineering Chemical (1), Engineering Civil (7), Engineering Electrical Electronic (4), Engineering Industrial (7), Engineering Manufacturing (2), Engineering Marine (1), Engineering Mechanical (1), Engineering Multidisciplinary (3), Entomology (4), Environmental Sciences (46), Environmental Studies (5), Ethics (1), Evolutionary Biology (5), Film Radio Television (1), Food Science Technology (16), Forestry (1), Gastroenterology Hepatology (2), Geography (2), Green Sustainable Science Technology (3), History (1), Hospitality Leisure Sport Tourism (9), Imaging Science Photographic Technology (1), Immunology (14), Infectious Diseases (18), Information Science Library Science (4), Instruments Instrumentation (1), Linguistics (5), Literary Theory Criticism (1), Literature (1), Materials Science Multidisciplinary (3), Mathematical Computational Biology (1), Mathematics Interdisciplinary Applications (1), Medical Laboratory Technology (3), Metallurgy Metallurgical Engineering (1), Meteorology Atmospheric Sciences (1), Microbiology (3), Nanoscience Nanotechnology (2), Nutrition Dietetics (18), Oceanography (1), Oncology (10), Operations Research Management Science (5), Ophthalmology (2), Orthopedics (4), Otorhinolaryngology (2), Parasitology (5), Pediatrics (54), Peripheral Vascular Disease (2), Physics Applied (1), Plant Sciences (1), Political Science (3), Radiology Nuclear Medicine Medical Imaging (5), Religion (1), Rehabilitation (10), Respiratory System (3), Rheumatology (2), Social Sciences Mathematical Methods (2), Statistics Probability (2), Substance Abuse (4), Surgery (13), Telecommunications (3), Theater (2), Thermodynamics (1), Toxicology (9), Transportation (1), Tropical Medicine (10), Veterinary Sciences (22), Virology (4), Water Resources (3), Zoology (3).

[4] The exact search string was as follows: ("hormonal change*" OR "menstrua" OR "PMS" OR "pregnan*" OR "prenatal" OR "postpartum" OR "postnatal" OR "lactati*" OR "breastfe*" OR "maternity" OR "maternal" OR "menopaus") AND ("professional" OR "workplace" OR "at work" OR "on work" OR "working women" OR "workers" OR "employee" OR "employees" OR "employment") AND ("performance" OR "productivity" OR "absenteeism" OR "presenteeism" OR "sick leave" OR "sick day*" OR "absence from work" OR "absent from work" OR "present at work" OR "efficiency").

identified based on the existing literature. Prior to the decision of employing these keywords, a pilot search was conducted: a list of four key studies per 'M' was compiled, consisting of Cook and van den Hoek (2023), Gatrell (2011a), Geukes et al. (2012), Geukes et al. (2016), Gutke et al. (2014), Ishimaru et al. (2023), Nakamura et al. (2022), Ponzo et al. (2022), Schoep et al. (2019), Truong et al. (2017), Vincent et al. (2024), and Xu et al. (2022), and in the pilot search was verified whether these key studies were retrieved using the search terms, thereby confirming the effectiveness of the search strategy (Xiao & Watson, 2019). All key studies were identified through this search, except for two, namely Geukes et al. (2012) and Vincent et al. (2024). However, these studies were subsequently identified through forward and backward citation screening, further highlighting the importance of these complementary search methods.

This search strategy relied on the Web of Science Core Collection and included therefore only peer-reviewed studies. This approach enhanced the reliability and quality of the findings, as these studies have undergone a rigorous review and publication process (Weichselbaumer & Winter-Ebmer, 2005). However, this restriction may have introduced a risk of sample bias, as studies reporting significant findings are more likely to be published, potentially resulting in publication bias. Nevertheless, as the focus of this review was on identifying broader patterns and trends in the literature rather than on estimating precise effect sizes from individual studies, the potential impact of publication bias was expected to be limited.

3.2 Study selection

The study selection process was documented step by step to ensure transparency and is visualised in the PRISMA flow diagram (Page et al., 2021) in Figure 1. The initial manual search based on keywords in the Web of Science Core Collection yielded 1,101 articles, including one duplicate, which was removed. Using titles and abstracts, these 1,100 articles were screened and included or excluded based on the SPIDER inclusion criteria. The online tool Rayyan was used to facilitate this process. The screening was performed independently by two screeners, resulting in an inter-rater reliability (IRR) of 93.9% and a Cohen's kappa of 0.691. According to Landis and Koch (1977), these values indicate substantial agreement. Any disagreements were discussed between the two screeners until consensus was reached,

resulting in retainment of 100 studies. These 100 studies were further screened by the first screener by means of a full-text assessment and again included or excluded based on the SPIDER inclusion criteria. The most common reasons for exclusion during the full-text screening were the absence of a direct link between the three M's and the workplace (n = 22), a focus on clinical studies or other interventions (n = 20)[5], the use of secondary data (n = 9), or lack of access to the full text (n = 5). Other reasons for exclusion included an exclusive focus on well-being (n = 2), the absence of an English-language version of the article (n = 2), and a primary focus on legislation (n = 1). This ultimately resulted in a final sample of 39 articles.

<Figure 1 about here>

The second step, i.e., forward and backward citation screening, involved examining the citations and reference lists of each of the 39 selected articles, which resulted in 1,723 additional records. Of these, 361 duplicates were removed. The remaining articles were screened again based on title and abstract by the first screener, resulting in 76 articles retained for full-text assessment. Subsequently, the first screener conducted full-text screening. The most common reasons for exclusion during the full-text screening were, again, the use of secondary data (n = 22), the absence of a direct link to the work context (n = 16), and limited access to the full text (n = 8). Additional reasons for exclusion included a primary focus on well-being (n = 3), articles classified as opinion papers (n = 3), studies evaluating clinical interventions or other interventions (n = 3), samples that did not meet the inclusion criteria (n = 2), and the absence of an English-language version (n = 1). This process of forward and backward citation screening resulted therefore in a total of 18 additional articles. Together with the 39 articles retained in the first step (i.e., the initial manual search based on keywords), a total of 57 articles were ultimately included in the review.

[5] The screening of articles was conducted based on the direct workplace effects of an M. Consequently, the solutions discussed in RQ3 were derived exclusively from studies that addressed these direct effects and their underlying causes. Studies that primarily focused on evaluating interventions, without examining the direct workplace impact of an M, were not included in the systematic literature review.

3.3 Data extraction

The following data were extracted from the selected articles: bibliographic information (author and year), geographical region, research method (e.g., survey or interview), sample characteristics including the number of participants, key findings regarding the effects of the three M's on workplace outcomes (RQ1), explanations for these findings (RQ2), and any proposed solutions (RQ3). When an article reported multiple independent studies (e.g., separate experiments using different designs and samples), each study was treated as a separate unit of analysis and data were extracted accordingly. As a result, although 57 articles were included, the final dataset consisted of 58 studies.

4. Results

This section examines the main patterns and findings from the articles included in the literature review. Specifically, it addresses the extent to which symptoms related to menstruation, maternity, and menopause influence the work performance and work attendance of employed women (RQ1), as well as how these effects occur (RQ2). In addition, solutions proposed in the selected articles to address the negative consequences of the three M's are identified (RQ3). In what follows, for each of the three M's, findings are synthesised along three outcome domains (work performance, presenteeism, absenteeism) and three recurring pathways (biological, psychological, and contextual mechanisms), and solutions that are proposed in the included studies are discussed.

Table 2 provides an overview of the 58 studies included in the review. Regarding geographical distribution, more than half of the included studies were conducted in Europe (34 out of 58 studies; 58.6%), of which 12 (out of 58 studies; 20.7%) were carried out in the United Kingdom. Ten out of 58 studies (17.2%) were conducted in Asia, while the remaining studies (14 out of 58 studies; 24.1%) originated from other continents. In terms of methodology, the majority of studies (43 out of 58 studies; 74.1%) used surveys as a research instrument, followed by interviews (12 out of 58 studies; 20.7%). A smaller number of studies used a combination of multiple research instruments (2 out of 58 studies; 3.4%)

or focus groups (1 out of 58 studies; 1.7%).

<Table 2 about here>

4.1 Menstruation

The impact of menstruation in the workplace is examined in 23 of the 58 studies (39.7%). Of these 23 studies, 14 investigate the impact of the menstrual phase (60.9%), 8 focus on the effects of the premenstrual phase (34.8%), and 1 examines the influence of the mid-luteal phase (4.3%). As each phase is associated with specific effects, the findings for RQ1 and RQ2 are discussed separately for each phase. Next, we conclude with the solutions identified in the selected articles for the negative impact of symptoms related to the full menstrual cycle to answer RQ3.

In light of RQ1, we first investigate to what extent the menstrual phase influences the work performance and work attendance of employed women. Several studies show that the menstrual phase is associated with a decline in work performance (Mandeville et al., 2021; Mbongo et al., 2023; Zaman & Mohiuddin, 2023). This is also confirmed by the large-scale study by Schoep et al. (2019): of the 32,748 participating women aged 15 to 45 years, as many as 80% reported productivity loss while present at work during menstruation. The majority of women in the study by Ponzo et al. (2022) report experiencing a moderate to severe impact of menstruation on their concentration and efficiency. Studies conducted specifically among nurses also report a negative impact of menstruation on work performance, affecting their ability to provide optimal care (Yöndem & Çıtak Bilgin, 2022; Yu et al., 2021). Despite these symptoms, women often continue working, even when the severity of their symptoms would justify absence (Cook & van den Hoek, 2023; De Arruda et al., 2024; Yöndem & Çıtak Bilgin, 2022). In addition, menstruation is also associated with absenteeism. This is examined in more than half of the studies addressing menstruation. For example, in Hennegan et al. (2022), 15% of women aged 18 to 45 years report absenteeism during menstruation. Similarly, Schoep et al. (2019) and Leon-Larios et al. (2024) report comparable findings. According to Schoep et al. (2019), menstruation-related symptoms among working women are associated with a mean absenteeism of 0.9 days per year. The study further shows that the estimated annual number of lost productive days due to presenteeism is about seven times higher than the mean number of lost productive days

due to absenteeism.

Next, in light of RQ2, we investigate how the menstrual phase influences the work performance and work attendance of employed women. An important explanation for the negative effects relates to biological symptoms (which may in turn also affect women's psychological well-being, see below). Heavy menstrual bleeding, cramps, headaches, fatigue, back pain, and lower energy levels are frequently identified as key factors underlying reduced work performance, increased presenteeism, and absenteeism (Ponzo et al., 2022; Yöndem & Çıtak Bilgin, 2022; Yu et al., 2021).[6] The severity of these symptoms appears to play an important role. For example, De Arruda et al. (2024) find that women experiencing heavy menstruation are twice as likely to report poorer work performance and higher levels of presenteeism compared to women with milder menstrual symptoms. Mbongo et al. (2023) likewise find a positive association between pain intensity and increased presenteeism. These biological symptoms and their severity also appear to be a primary driver of absenteeism (Fooladi et al., 2023; Leon-Larios et al., 2024; Mandeville et al., 2021). Fooladi et al. (2023) report that women with dysmenorrhoea (i.e., cramping pain in the lower abdomen) are twice as likely to report absenteeism compared to women without menstrual pain (Fooladi et al., 2023). Leon-Larios et al. (2024) confirm these findings, showing that pain severity is positively correlated with the frequency of sick leave. Finally, it is interesting to note that the absence of a formal medical diagnosis does not necessarily imply a lower impact on work: Mandeville et al. (2021) find that women with primary (i.e., without an underlying medical condition) dysmenorrhoea report similar levels of negative work impact as women with secondary (i.e., related to an underlying medical condition) dysmenorrhoea.[7]

In addition to biological symptoms, the broader workplace and cultural context also play

[6] Both the menstrual phase and the premenstrual phase (which corresponds with the late luteal stage) are often associated with negative symptoms, such as dysmenorrhoea, defined as cramping pain in the lower abdomen occurring shortly before or during menstruation (Fooladi et al., 2023), and premenstrual syndrome (PMS), which involves biological and psychological symptoms such as fatigue, irritability, and mood changes (De Arruda et al., 2024). A more severe form is premenstrual dysphoric disorder (PMDD), which involves more intense emotional and functional impairment (Heinemann et al., 2010).

[7] Secondary dysmenorrhoea refers to severe menstrual pain resulting from an underlying medical condition, such as uterine fibroids, endometriosis, polycystic ovary syndrome (PCOS), or menorrhagia (i.e., menstrual bleeding lasting longer than seven days) (Mandeville et al., 2021).

an important role in explaining the negative impact of menstruation on work performance and work attendance. Menstruation-related stigma and concerns can lead to feelings of stress and shame (Zaman & Mohiuddin, 2023). In some countries, such as Uganda, Namibia, and Bangladesh, the lack of adequate sanitary facilities and limited access to menstrual products contribute to both reduced productivity and absenteeism (Hennegan et al., 2020, 2022; Mbongo et al., 2023; Zaman & Mohiuddin, 2023). Furthermore, menstruation-related stigma resulting from cultural taboos has been shown to negatively affect the work performance of female employees (Sang et al., 2021; Zaman & Mohiuddin, 2023). Women may feel compelled to conceal their menstruation and related symptoms, which may increase the likelihood of both presenteeism and absenteeism (Sang et al., 2021; Zaman & Mohiuddin, 2023).

In addition to the menstrual phase, the premenstrual phase is the second phase frequently addressed in the literature. The answer to RQ1 is clear: the premenstrual phase has also been linked to negative effects on work performance, as well as increased presenteeism and absenteeism (Chen et al., 2024; Hardy & Hunter, 2021; Heinemann et al., 2012). Using a large-scale study, Heinemann et al. (2012) find that women experiencing moderate to severe premenstrual symptoms are not only significantly more likely to take sick leave, but also report reduced concentration, resulting in more errors and slower performance. Similarly, Hardy and Hunter (2021) report that female employees with moderate to severe premenstrual symptoms experienced negative effects on their work performance. These women are up to five times more likely to be absent compared to their colleagues with no or mild premenstrual symptoms (Hardy & Hunter, 2021). Likewise, Chen et al. (2024), in a study focusing specifically on nurses, find that premenstrual symptoms are associated with missed nursing care tasks, with some specific tasks, such as monitoring fluid intake or medication administration, being delayed or left incomplete in about 43% of cases. The remaining studies examining the premenstrual phase confirm this pattern, indicating that the premenstrual phase is associated with both reduced work performance and increased absence among working women.

Next, in light of RQ2, we discuss explanations for the impact of the premenstrual phase on work performance and work attendance. During the premenstrual phase, in addition to biological symptoms such as concentration difficulties and lower energy levels, psychological

symptoms appear to play a particularly important role. Mood swings, irritability, and feelings of anxiety are frequently reported and linked to the premenstrual phase (Chen et al., 2024; Hardy & Hardie, 2017; Hardy & Hunter, 2021; Heinemann et al., 2012; Khazdoozi et al., 2024; Loukzadeh et al., 2024).

To complete the picture for RQ1 and RQ2, it is worth noting that, although the menstrual and premenstrual phases have been most frequently examined and are predominantly linked to negative effects on work performance and attendance, other phases of the menstrual cycle may be associated with more favourable outcomes. As the only included study examining the mid-luteal phase, Xu et al. (2022) find that women perform better on cognitive flexibility and divided attention tasks during this phase compared to the menstrual and late-follicular phases, suggesting that women may be better able to switch between tasks and attend to multiple stimuli simultaneously (e.g., visual and auditory signals) during this phase. This finding indicates that the impact of the menstrual cycle on work performance and attendance is not uniformly negative, but varies across phases, with both adverse and potentially beneficial effects.[8]

In light of RQ3, we conclude this section with the solutions for the negative impact of symptoms related to the menstrual cycle identified in the literature. Three main types of solutions are frequently mentioned. First, most studies highlight flexibility in work location and working hours as a key strategy. Hardy and Hardie (2017) and Mbongo et al. (2023) report that women prefer working from home during menstruation, as it allows them to manage their symptoms more effectively. Furthermore, Cook and van den Hoek (2023) find a negative correlation between working from home during menstruation and presenteeism. This may reflect that working from home allows women to manage symptoms more effectively, for example by taking a break to lie down during periods of more severe symptoms, thereby avoiding working while experiencing major discomfort. Several other studies also emphasise the importance of flexible working hours (De Arruda et al., 2024; Hardy & Hardie, 2017; Hardy & Hunter, 2021; Mbongo et al., 2023; Schoep et al., 2019), allowing women to adjust their working hours and tasks according to the severity of their symptoms. Flexibility in work schedules could mitigate the negative effect of the menstrual

[8] Although not included in the 57 reviewed studies, the review of Le et al. (2020) for example also shows that during the ovulatory phase improved mood and higher energy levels may be present due to estrogen positively influencing emotional processes.

cycle on work performance; temporary reductions in performance during some phases of the menstrual cycle may be offset by improved performance during other phases of the cycle (Xu et al., 2022). Finally, some researchers advocate menstrual leave for women experiencing severe symptoms, without requiring them to rely on sick leave (Mbongo et al., 2023; Zaman & Mohiuddin, 2023).

Second, the literature highlights the importance of access to adequate sanitary facilities, menstrual products, and symptom management strategies at work (Hardy & Hunter, 2021; Hennegan et al., 2022; Mbongo et al., 2023; Zaman & Mohiuddin, 2023; Yu et al., 2021). The latter can include providing access to warm drinks, pain medication, and heat pads (Yu et al., 2021). Such basic provisions can help women feel more comfortable during menstruation and may, in turn, reduce absenteeism (Hardy & Hunter, 2021; Hennegan et al., 2022; Mbongo et al., 2023; Zaman & Mohiuddin, 2023).

Finally, a third set of recommendations focuses on organisational culture. Menstruation often remains a taboo topic in the workplace, which may contribute to presenteeism (Yu et al., 2021). Many researchers therefore emphasise the importance of breaking menstrual stigma in order to facilitate supportive networks within organisations (Sang et al., 2021; Zaman & Mohiuddin, 2023). This should be combined with greater recognition, awareness, and targeted education, for example on symptom and pain management (De Arruda et al., 2024; Hardy & Hardie, 2017; Hennegan et al., 2022; Khazdoozi et al., 2024; Schmelzer et al., 2015; Yöndem & Çıtak Bilgin, 2022; Yu et al., 2021). For example, organisations could stimulate personal use of menstrual tracking applications, since Ponzo et al. (2022) state it could support education and symptom management.

4.2 Maternity

The impact of maternity in the workplace is examined in 11 of the 58 included studies (19.0%). All of these studies focus specifically on the pregnancy phase. Therefore, the term pregnancy is used consistently throughout the results section, rather than maternity.

Pregnancy has a clear impact on women's performance and attendance at work (RQ1). Only one included study reports a positive effect of pregnancy on work performance: Duan et al. (2022) find a link between pregnancy and completing work assignments on time and

meeting the supervisor's expectations.[9] However, most of the effects of pregnancy discussed in the literature are negative. Many pregnant women experience productivity loss and reduced work performance compared to non-pregnant women (Nakamura et al., 2022). Presenteeism has also been observed among pregnant women (Gatrell, 2011a; Wada et al., 2021). Notably, the majority of the included studies (9 out of 11; 81.8%) focus on absenteeism related to pregnancy. Compared to non-pregnant women, pregnant women are significantly more likely to be absent from work (Nakamura et al., 2022). Using a longitudinal design, Dørheim et al. (2013) find that approximately 75% of pregnant women take sick leave at some point during their pregnancy. Around the 32nd week of pregnancy, 63.2% of women are on sick leave, and 13.8% are absent throughout all three trimesters. Only one in five pregnant women does not take any sick leave. Although the average duration of absence remains limited to a few days per year, higher levels of absence are observed in specific cases, such as in cases involving pregnancy-related complications (Dørheim et al., 2013).

The causes of reduced work performance and increased absenteeism during pregnancy, as a partial answer to RQ2, include psychological factors (e.g., mental health problems; Nakamura et al., 2022) but are predominantly biological. The latter include low back pain, pelvic pain, nausea, and fatigue, which are frequently reported as reasons for absence among pregnant women and their severity is strongly correlated with the level of absenteeism (Backhausen et al., 2019; Dørheim et al., 2013; Gutke et al., 2014; Nakamura et al., 2022; Stafne et al., 2019). Backhausen et al. (2019) report that 90% of women at 32 weeks of pregnancy experience low back pain, and that the severity of this pain is correlated with taking sick leave. Similarly, Gutke et al. (2014) find that low back pain and pelvic pain among pregnant women are associated with sick leave, with higher pain levels linked to a greater likelihood of absence. In line with these findings, Stafne et al. (2019) conclude that pregnant women experiencing such symptoms are two to three times more likely to be absent than women without low back or pelvic pain.

For the potential positive effects of pregnancy on work performance and for the occurrence of presenteeism, the workplace and cultural context are primarily identified as

[9] Although not included in the 57 reviewed studies, the review of Anderson and Rutherford (2012) also finds that pregnant women may process social stimuli (i.e., emotions) more effectively, which may lead to improved collaboration and communication with colleagues.

answers to RQ2. Pregnant women may show an increased tendency towards impression management (Duan et al., 2022). Their greater efforts to maintain a professional image are associated with better work performance, defined by Duan et al. (2022) as completing tasks on time and meeting supervisors' expectations. However, this effect appears to be less pronounced when pregnant women feel supported by their supervisors during pregnancy (Duan et al., 2022). This suggests that women may experience pressure to present themselves positively in the workplace, depending on social expectations and organisational attitudes towards pregnancy. This pressure also appears to be an important underlying reason for presenteeism among pregnant women, as they may feel compelled to appear professional, healthy, and reliable regardless of their actual biological or mental condition (Gatrell, 2011a; Wada et al., 2021). As a result, pregnant women may continue working despite persistent symptoms such as morning sickness, vomiting, or other severe pregnancy-related complaints (Gatrell, 2011a; Wada et al., 2021). Wada et al. (2021) further note that presenteeism during pregnancy is influenced not only by organisational responses to pregnancy, but also by factors such as work-related stress, the severity of pregnancy symptoms, and gestational age.

The most prominent solution identified in the literature to mitigate the negative consequences of pregnancy on work performance and attendance (RQ3) is adapting working conditions for pregnant women (Dørheim et al., 2013; Nakamura et al., 2022; Pedersen et al., 2021; Stafne et al., 2019; Villar et al., 2019). Besides work-life conflict and low job satisfaction, workplace risk factors increase the likelihood and duration of absence during pregnancy (Pedersen et al., 2021). Such factors include a high workload and pace, shift work, and physically demanding tasks (such as heavy lifting, prolonged standing, and extensive walking) (Pedersen et al., 2021). Working conditions of pregnant women should be adapted to avoid these risk factors.

4.3 Menopause

The impact of menopausal transition in the workplace is examined in 24 of the 58 studies (41.4%). In the literature, the focus is often placed on the menopausal transition as a whole and the accompanying symptoms rather than on a specific stage such as perimenopause or postmenopause. Therefore, we do not make a distinction between these stages as we did

for menstruation in section 4.1.

A negative influence of menopausal symptoms on women's work performance is reported in the included studies, contributing to answering RQ1. The majority of these studies focus on women's subjective work experiences. For example, Griffiths et al. (2013) find that one third of women aged between 45 and 55 report that their menopausal symptoms negatively affect their work performance. These findings are further supported by multiple studies using the Work Ability Index as a measure of self-reported work ability, including indicators related to work performance (Geukes et al., 2012, 2016; Humeniuk et al., 2019; Olajubu et al., 2017; Oude Hengel et al., 2023; Saarinen et al., 2024).[10] These studies likewise indicate a negative association between menopausal symptoms and work ability. For instance, Saarinen et al. (2024) find that women experiencing menopausal symptoms are 1.5 times more likely to report poor perceived work ability.

Providing further insight into RQ1, menopausal symptoms do not only lead to reduced work performance, but also to increased absenteeism (Adelekan-Kamara et al., 2023; Beck et al., 2020; Geukes et al., 2012, 2016). More specifically, O'Neill et al. (2023) report that 18% of female hospital employees take sick leave due to menopausal symptoms. In a general sample of employed women, not limited to the healthcare sector, Faubion et al. (2023) report a lower percentage (approximately 10%). Nevertheless, both studies indicate the same overall trend of increased absenteeism during menopause. While the average duration of absence remains limited to a few days per year, higher levels of absenteeism are observed in specific cases, particularly among women experiencing severe menopausal symptoms (Beck et al., 2020).

Finally, evidence on presenteeism provides additional insight into the impact of menopausal symptoms on work performance and attendance (RQ1). Some women keep working despite severe menopausal symptoms: Ishimaru et al. (2023) report that women with severe menopausal symptoms are up to twelve times more likely to experience

[10] The Work Ability Index (WAI) is a widely used instrument for assessing work ability, including indicators related to work performance and absenteeism. It is based on seven dimensions: (i) current work ability compared with the individual's lifetime best, (ii) work ability in relation to the physical and psychological demands of the job, (iii) the number of diagnosed health conditions, (iv) the extent to which health problems impair work performance, (v) sickness absence during the past year, (vi) the individual's prognosis of their future work ability, and (vii) mental resources (Geukes et al., 2012, 2016).

presenteeism than women without symptoms.

The impact of the menopausal transition on work performance and attendance can be explained by hormonal changes (RQ2). These are the primary cause of symptoms such as hot flushes, night sweats, joint pain, sleep disturbances, fatigue, concentration difficulties, and memory problems (Beck et al., 2020; Cronin et al., 2023; Gartoulla et al., 2016; Gottardello & Steffan, 2024; Griffiths et al., 2013; Hammam et al., 2012; Hickey et al., 2017; Olajubu et al., 2017; Steffan & Potočnik, 2023; Willman & King, 2023). Several studies show that these symptoms negatively affect work performance, with the impact increasing as symptom severity worsens (Faubion et al., 2023; O'Neill et al., 2023). For example, physicians and nurses report making more errors and being unable to provide optimal patient care as a result of these symptoms (Adelekan-Kamara et al., 2023; Cronin et al., 2023). These symptoms are likewise associated with presenteeism. Furthermore, persistence of these symptoms may contribute to absenteeism, with fatigue and hot flushes most frequently identified as having the greatest impact (Adelekan-Kamara et al., 2023; Geukes et al., 2016; O'Neill et al., 2023).

In addition to the aforementioned biological effects, the menopausal transition is also associated with psychological consequences. Hormonal changes may lead to feelings of anxiety and mood swings (Griffiths et al., 2013; Hammam et al., 2012; Hobson & Dennis, 2024; Steffan & Potočnik, 2023). Psychological difficulties may also arise as a result of biological changes. For example, cognitive impairments such as memory and concentration problems, as well as visible symptoms such as hot flushes, may lead to feelings of embarrassment and reduced self-confidence, which in turn negatively affect work performance (Cronin et al., 2023). Biological and psychological factors therefore appear to reinforce each other. For instance, Hickey et al. (2017) report that one third of women make errors at work due to mental health-related difficulties, with physical symptoms such as fatigue resulting from sleep disturbances and night sweats further exacerbating this impact. Guidetti et al. (2022) state that only physical symptoms are directly associated with increased presenteeism, whereas psychological symptoms are not. In contrast, Ishimaru et al. (2023) report the opposite pattern, finding a significant relationship between psychological symptoms and presenteeism, but not between physical symptoms and presenteeism.

It should also be noted that the answers to RQ1 and RQ2 can differ across occupations and job roles (Cronin et al., 2023; Vincent et al., 2024). For example, nurses report increased concerns about making errors due to concentration difficulties and fatigue (Cronin et al., 2023). In combination with physical symptoms, this creates additional challenges in providing patient care (Cronin et al., 2023). Presenteeism is also commonly reported in the medical profession, where physicians may prioritise their professional responsibilities over their symptoms (Adelekan-Kamara et al., 2023; Kinman, 2019). Vincent et al. (2024) likewise emphasise that the impact of menopausal symptoms varies depending on job role. For instance, analysts may be more affected by cognitive symptoms such as concentration difficulties, whereas in customer-facing roles, biological symptoms such as hot flushes may be experienced as more disruptive.

Finally, the solutions proposed in the literature are discussed (RQ3). These solutions primarily focus on improving knowledge, awareness, and support, which are considered essential for developing sustainable and inclusive workplace practices. Adelekan-Kamara et al. (2023), for example, highlight the importance of open dialogue about menopause in the workplace in order to facilitate appropriate workplace adjustments and support. Such adjustments may include rest breaks, temperature control, and reduced physical workload (Adelekan-Kamara et al., 2023; Guidetti et al., 2022; Hickey et al., 2017), as well as flexible working hours (O'Neill et al., 2023). Education is also frequently recommended, particularly regarding effective strategies for managing menopausal symptoms (Geukes et al., 2016; Hobson & Dennis, 2024), as well as raising awareness of the importance of appropriate workplace support during menopause (Griffiths et al., 2013; Hammam et al., 2012; Olajubu et al., 2017).

5. Conclusion and discussion

Until now, the literature has offered no integrated view of how the reproductive life course experiences of menstruation, maternity, and menopause (i.e., the three M's) influence women's work performance and attendance, despite women comprising a substantial proportion of the working population. This study is, to the best of our knowledge, the first

systematic literature review on the impact of the three M's on the work performance and attendance of employed women. More specifically, we examined (i) the extent to which and (ii) the mechanisms through which the three M's influence women's work performance and attendance, as well as (iii) the solutions proposed to mitigate the negative consequences of the three M's on work performance and attendance.

Although menstruation, pregnancy, and menopause are distinct reproductive experiences, this review demonstrates that all three negatively affect women's work performance and work attendance. However, the nature and magnitude of these effects differ across the three M's. Menstruation is associated with a decrease in work performance and an increase in absenteeism and presenteeism. However, studies suggest that its work-related impact is particularly pronounced through presenteeism, with many women continuing to work despite substantial symptoms. In the existing literature, presenteeism is indeed discussed more frequently in relation to menstruation than to pregnancy or menopause. Pregnancy, in contrast, is most strongly associated with absenteeism, with a large proportion of women taking sick leave at some point during pregnancy. Menopause is characterised by a broader pattern of reduced work ability, accompanied by absenteeism, particularly among women experiencing severe menopausal symptoms. Overall, the findings demonstrate that reproductive health affects not only whether women attend work, but also how effectively they are able to perform while at work.

The review also provides important insights into the mechanisms underlying these workplace outcomes. Across all three M's, biological symptom severity consistently emerges as the strongest predictor of reduced work performance and work attendance. For menstruation, the key symptoms are pain and heavy bleeding; for pregnancy, they include low back pain, pelvic pain, nausea, and fatigue; for menopause, they include hot flushes, sleep disturbances, and concentration difficulties. These biological symptoms are often accompanied by psychological responses, including anxiety, embarrassment, reduced self-confidence, mood changes, and concerns about making mistakes at work. The findings further suggest that biological and psychological mechanisms frequently reinforce one another. For example, menopausal hot flushes and sleep disturbances may lead to fatigue and concentration difficulties, which in turn increase anxiety about making errors at work and further impair work performance. Finally, workplace context strongly shapes the extent

to which biological and psychological responses affect work performance, presenteeism, and absenteeism. Menstruation-related stigma and inadequate sanitary facilities contribute to poorer work performance and increased absenteeism, organisational expectations during pregnancy may encourage women to continue working despite severe symptoms, and during menopause the impact of symptoms partly depends on job characteristics, with cognitively demanding jobs being particularly affected by concentration and memory problems, while physically demanding and customer-facing roles may be more disrupted by physical symptoms such as fatigue and hot flushes.

Finally, the review provides several practical implications for employers and policymakers. The evidence consistently points to three complementary types of workplace interventions. First, flexibility in working hours and work location appears particularly beneficial for women experiencing menstrual and menopausal symptoms, allowing them to adapt work to symptom fluctuations. Second, practical workplace adjustments are especially important during pregnancy and menopause. The literature consistently recommends measures such as reducing heavy lifting, prolonged standing, shift work, and excessive workloads during pregnancy, alongside rest breaks, temperature control, and reduced physical workload during menopause. Third, these practical measures should be embedded within a supportive organisational culture. Across all three M's, the literature highlights that open communication, education of managers, and initiatives to increase awareness and reduce stigma surrounding women's reproductive health are essential for encouraging timely disclosure of symptoms and facilitating appropriate workplace support.

This systematic literature review identifies several gaps in the existing literature. First, it highlights two methodological limitations in current research. On the one hand, causal inference remains limited. The literature cannot yet establish whether the three M's cause the observed changes in work performance and attendance rather than merely co-occurring with them. This is because almost all included studies rely on cross-sectional designs, with no experimental studies and only a small proportion adopting a longitudinal design (7 of 58 studies; 12.1%). On the other hand, it remains unclear to what extent the reported effects reflect objective changes in work performance rather than perceived changes in work performance. This uncertainty arises because work performance is assessed predominantly through subjective self-report measures (e.g., surveys, interviews, and focus groups), which

capture employees' perceptions of their own work performance rather than their actual work performance. Objective indicators, supervisor ratings, and experimental performance tasks, which are rarely used, would allow this distinction to be drawn. Future research should therefore make greater use of longitudinal and experimental designs, as well as objective performance measures.

Second, the limited use of longitudinal research designs is closely linked to a broader limitation, namely the absence of a life course perspective in the current literature. More specifically, most studies focus on a single stage or a limited time period, even though the three M's together span a substantial part of women's adult lives. There is thus a clear need for research that integrates multiple reproductive life course experiences to better understand the cumulative and changing impact of the three M's on women's work performance and attendance. Beyond the life course as a whole, insufficient attention is paid to sub-phases within each M, despite meaningful differences in symptoms and work-related consequences. For example, examining within-person fluctuations in work performance across the full menstrual cycle could provide a more nuanced understanding of expected declines during menstruation as well as potential improvements during other phases. Such an approach would also allow positive effects to be examined, rather than focusing exclusively on negative effects (see also next limitation). Relatedly, the pregnancy literature in this review focuses almost exclusively on the pregnancy phase, with limited attention to the postpartum period. Similarly, few studies distinguish between phases of the menopausal transition. Longitudinal designs and diary studies would be particularly valuable in this regard, as they enable changes within individuals over time and across sub-phases to be examined more precisely.

Third, the literature demonstrates a strong emphasis on the negative effects on work outcomes, with limited attention to potential positive effects. More specifically, research to date has largely focused on adverse consequences of the three M's, whereas potentially positive effects remain largely under-examined (e.g., improved cognitive functioning or social interaction during specific phases of the menstrual cycle). Only a small number of studies report such positive effects (Anderson & Rutherford, 2012; Duan et al., 2022; Le et al., 2020; Xu et al., 2022). Future research should therefore investigate positive dimensions more explicitly and consider how organisations might leverage such insights to optimise

women's functioning at work.

Fourth, despite the emphasis on negative effects, little attention in the included studies has been devoted to discussing solutions. Within the scope of the present review, the number of proposed recommendations is limited; they are often broad and rarely tested for effectiveness. This may partly reflect the relative novelty of the research field, which has primarily focused on documenting the impact of the three M's rather than discussing solutions. Nevertheless, many researchers stress the need for future intervention research (Adelekan-Kamara et al., 2023; Dørheim et al., 2013; Fooladi et al., 2023; Gottardello & Steffan, 2024; Hennegan et al., 2020; Hobson & Dennis, 2024; Stafne et al., 2019) assessing the effectiveness of workplace adjustments, such as flexible working hours and work content adjustments. It may be particularly valuable to develop and test interventions that support women across multiple reproductive life course experiences rather than targeting only a single stage in isolation. Interventions currently proposed in relation to one reproductive life experience may also be applicable to others. For example, the pregnancy literature primarily focuses on adjustments to work content, whereas strategies proposed in the menstruation and menopause literature (such as flexible working arrangements) may likewise help mitigate the negative consequences of maternity on work performance and attendance.

Fifth, there has been limited attention to moderating factors of the impact of the three M's on work performance and attendance. Although a small number of studies consider work-contextual factors such as occupation, workload, and social support (Cook & van den Hoek, 2023; Cronin et al., 2023; Duan et al., 2022; Vincent et al., 2024; Xu et al., 2022), other moderators remain under-explored. For example, some studies exclude women using hormonal contraception (e.g., Fooladi et al., 2023), leaving limited evidence regarding the work-related impact among this substantial group. Cultural factors also remain relatively under-studied, despite indications that stigma, social norms, and workplace culture shape how women manage menstruation, maternity, and menopause at work. Further research on these moderators is therefore essential to understand when and for whom the impact of the three M's is amplified or attenuated.

Finally, the generalisability of the evidence base is constrained by a strong focus on specific sectors. A considerable proportion of studies are conducted in healthcare settings, particularly among nurses. While this is an important population, such sectoral

concentration limits the extent to which findings can be generalised to other occupations and work contexts. Future research should therefore include more diverse samples across sectors, job levels, and work environments, to provide a more comprehensive understanding of the impact of the three M's on women's working lives and to examine how these effects vary across different occupational and organisational contexts.

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Tables

Table 1. Inclusion criteria according to the SPIDER model of Cooke et al. (2012)

	Criteria	Details
S	Sample	Employed women who experience symptoms related to menstruation, maternity, or menopause.
PI	Phenomenon of Interest	Impact of symptoms related to menstruation, maternity, and menopause on work performance and work attendance.
D	Design	Empirical studies such as interviews, surveys, focus groups, experiments, and observations.
E	Evaluation	Subjective and objective outcomes related to work performance and work attendance.
R	Research type	Primary qualitative and quantitative empirical research.

Table 2. Overview of the included studies and their main results

(1) Author (year)	(2) Country	(3) Research method	(4) Sample (n)	(5) Main result(s) concerning the effect of menstruation, maternity, and menopause in the workplace
A. MENSTRUATION				
Chen et al. (2024)	China	Survey	Women aged 18 or older, with at least 1 year of work experience as a nurse, who voluntarily participate in this study (224)	Nurses report the negative impact of premenstrual symptoms on their **work performance** based on missed nursing care tasks, with some specific tasks, such as monitoring fluid intake or medication administration, being delayed or left incomplete in about 43% of cases. The strongest correlation is found with having cramps.
Cook and van den Hoek (2023)	The Netherlands	Survey	Individuals aged 18 or older who have experienced menstrual pain in the past 6 months, work at least 20 hours per week, and are not pregnant, not on maternity leave, or not on long-term sick leave (668)	The study shows that symptom severity is positively associated with **presenteeism**, while disclosure to managers and remote work are negatively associated with **presenteeism**. The latter may be explained by increased flexibility, which can facilitate better symptom management (e.g., access to rest or self-care strategies), thereby reducing the need to work while experiencing severe discomfort. A medical diagnosis moderates the relationship between symptom severity and **presenteeism**. Public attitudes toward concealing menstruation, on the other hand, are not associated with **presenteeism**.
De Arruda et al. (2024)	Brazil	Survey	Women aged 18 years or older who have menstruated in the 3 months prior to the study, are not pregnant, are not postmenopausal, are not less than 12 months postpartum, and do not have a diagnosed medical condition (430)	44% of female participants report going to work while feeling ill and as a result not functioning to their full capacity (**presenteeism** and impact on **work performance**). Women with heavy menstrual bleeding are more than twice as likely to experience an impact compared to women with mild or moderate menstrual bleeding. There is a positive correlation between the intensity of pain and the likelihood of **presenteeism** and impacted **work performance**.
Fooladi et al. (2023)	Australia	Survey	Women aged between 18 and 39 who do not use hormonal contraception, are not pregnant, are not breastfeeding, and are not in menopause (3555)	Half of the women report moderate to severe dysmenorrhea; of this group, half also experience negative consequences for their **work performance**. In addition, their likelihood of sick leave (**absenteeism**) is twice as high compared to other women.
Hardy and Hardie (2017)	United Kingdom	Interview	Women aged between 25 and 49 with medically diagnosed PMDD (15)	The women describe the days immediately before menstruation, when their symptoms are most severe, as the 'episode phase'. During this period, the women are unable to perform their work as normal (i.e., impact on **work performance**). **Absenteeism** also increases during this period. Depending on the severity of their symptoms, they are absent for three to five days per cycle and some even call in sick in advance because they know they will not be able to function properly.
Hardy and Hunter (2021)	United Kingdom	Survey	Women who work and have a menstrual cycle (125)	Female employees with moderate to severe premenstrual symptoms report that their **work performance** is negatively affected by these symptoms. Compared to women with no to moderate symptoms, they are five times more likely to experience **absenteeism** due to PMS.
Heinemann et al. (2010)	Austria, Brazil, Germany, and Spain	Survey	Women aged between 15 and 45 (2140)	Working women with moderate to severe PMS/PMDD report higher levels of productivity impairment than women without menstrual symptoms or with mild PMS (impact on **work performance**). They have more days with severe decreases in productivity and efficiency. In addition, **absenteeism** is more common among women with moderate to severe PMS/PMDD, with more than eight hours of absence per menstrual cycle.
Heinemann et al. (2012)	Germany	Survey	Women aged between 15 and 49 (4032)	Women with moderate to severe PMS/PMDD take significantly more sick leave (more than eight hours per menstrual cycle) (**absenteeism**) and experience a clear decline in productivity, partly due

				to reduced concentration and lower energy levels. This leads to slower performance and mistakes (impact on **work performance**).
Hennegan et al. (2020)	Uganda	Interview	Women aged between 18 and 49 (30)	Women indicate that they sometimes do not come to work during their period, which leads to **absenteeism**. Others continue to work despite severe pain (**presenteeism**) because they must meet social expectations or cannot afford to lose their income.
Hennegan et al. (2022)	Uganda	Survey	Women aged between 18 and 45 working in marketplaces, public primary schools, and health care facilities (525)	15% of women report **absenteeism** during their period, 19% indicate that they usually miss work during this period and 41% would prefer not to work during their period if possible.
Khazdoozi et al. (2024)	Iran	Survey	Women of childbearing age with a regular cycle in the six months prior to the study, working as nurses (318)	More than half of women (68.2%) experience severe PMS. There is a significant negative correlation between the severity of PMS and **work performance**. Performance here refers to the overall clinical performance of nurses, assessed based on clinical evaluation, support, care provision, coordination, systematic thinking and conflict management.
Leon-Larios et al. (2024)	Spain	Interview	Women aged between 15 and 49 (1800)	There is a link between menstrual pain and requests for sick leave (**absenteeism**), with the effect increasing as the pain becomes more severe. Younger women are more likely to report menstrual symptoms, such as severe pain and a higher need for sick leave. However, there are no differences between age groups when it comes to the impact that menstruation-related sick leave has on their professional lives.
Loukzadeh et al. (2024)	Iran	Survey	Women aged between 18 and 51 without endometriosis, uterine tumors, depression, anxiety disorders, or intestinal disorders, who are not pregnant, breastfeeding, or in the postmenopausal phase (358)	One-third of women experience PMS. There is a correlation between PMS status and productivity (**work performance**), with PMDD having the most significant negative impact on work capacity and productivity.
Mandeville et al. (2021)	Barbados	Survey	Women aged 18 or older with a pelvic disorder diagnosed by a healthcare provider (not confirmed by medical records) (192)	Women with primary dysmenorrhea (severe menstrual pain without medical condition) experience the same negative impact on work, such as **absenteeism** and loss of productivity (impact on **work performance**), as women with secondary dysmenorrhea (severe menstrual pain caused by medical conditions such as endometriosis). This suggests that even in the absence of a medical diagnosis, the impact on work is no less significant.
Mbongo et al. (2023)	Namibia	Interview	Women aged between 22 and 50 who menstruate (13)	Women report lower productivity on menstrual days compared to non-menstrual days, indicating a negative effect of menstruation on **work performance**. This negative impact is greater among women with heavy bleeding and pain than among women with milder symptoms (due to physical discomfort, lack of support, and lack of menstrual products).
Ponzo et al. (2022)	United States	Survey	Women older than 18 who use the premium (paid) version of Flo (a menstruation tracker app) (1867)	Most women experience a moderate to severe impact of their menstruation on their concentration, energy levels and efficiency, which leads to a decline in productivity (impact on **work performance**). In addition, almost half report an average absence of 5.8 days in the past 12 months due to their menstruation. Menstruation therefore causes **absenteeism**.
Sang et al. (2021)	Switzerland	Survey	Individuals (1% of participants does not identify as cisgender woman) between the ages of 20 and 65 who work in higher education (627)	Because of the stigma associated with menstruation, respondents feel compelled to hide their symptoms, which leads to **presenteeism**.

Schmelzer et al. (2015)	Germany, Switzerland, and Sweden	Survey	Women aged between 18 and 46, who have a regular cycle (between 23 and 32 days) and are not undergoing hormone therapy (91)	Women experience a decline in their **work performance** as their premenstrual symptoms become more severe. The impact is clear, although the influence on social activities appears to be even greater than on work.
Schoep et al. (2019)	The Netherlands	Survey	Woman aged between 15 and 45, who are students or working (32748), with 79,7% of the sample performing paid work more than five hours a week	Approximately 14% of women report **absenteeism** due to menstrual symptoms, but only 3.4% are absent during every or almost every cycle. On average, working women are absent 0.9 days per year due to their cycle. The percentage of women who report productivity loss while present at work (impact on **work performance**) during menstruation is much higher, at 80%. Moreover, the estimated annual number of lost productive days due to **presenteeism** is about seven times higher than the mean number of lost productive days due to absenteeism.
Xu et al. (2022)	United States	Survey, interview, experiment (longitudinal)	Women who are healthy, have a regular cycle between 24-35 days, have not used birth control pills or other hormonal medications in the past 3 months, are right-handed, and work as nurses (79)	During the mid-luteal phase (approximately one week after ovulation), women perform better in task switching (cognitive flexibility) and divided attention (processing visual and auditory information simultaneously) than during menstruation (impact on **work performance**). This effect is influenced by work pressure, and if the work pressure is too high, the cognitive advantages disappear.
Yöndem and Çıtak Bilgin (2022)	Turkey	Survey	Nurses aged between 18 and 45 who are not pregnant and not going through menopause (574)	Menstruating women report an increase in **presenteeism**, **absenteeism** (sick leave requests), and a negative impact of menstruation on their **work performance** and the quality of their services, particularly a decline in motivation, concentration, communication, and the performance of treatments. This impact is stronger with more severe symptoms.
Yu et al. (2021)	Taiwan	Interview	Nurses aged between 20 and 48 (with menstrual symptoms in the past 3 months) (90)	Menstrual symptoms such as pain, fatigue, and other physical discomforts reduce quality and productivity, for example, through problems with concentration, inability to provide optimal patient care, and rapid fatigue (impact on **work performance**). Despite experiencing symptoms, no leave is taken for fear of giving other colleagues more work and due to staff shortages, which leads to **presenteeism**.
Zaman and Mohiuddin (2023)	Bangladesh	Survey	Women (375)	Menstruation-related stigma, such as shame or cultural taboos, has a clear negative effect on the **work performance** of female employees. This performance relates to the quality and quantity of work and the efficient completion of tasks. Stigma-related stress or menstruation-related concerns increase the likelihood of **presenteeism**. Menstruation itself can also reduce efficiency and productivity, for example, because women stay home (**absenteeism**).
B. MATERNITY				
Backhausen et al. (2019)	Denmark	Survey (longitudinal)	Pregnant women (566)	90% of pregnant women report suffering from lower back pain at 32 weeks of pregnancy. The severity of this lower back pain is correlated with sick leave, resulting in **absenteeism**.
Dørheim et al. (2013)	Norway	Survey (longitudinal)	Women who were scheduled to give birth between November 2008 and April 2010 at Akershus University Hospital (2918)	Three out of four women take sick leave at some point during their pregnancy, which implies **absenteeism**. At 32 weeks, 63.2% of women are on sick leave. 13.8% of women are absent during all three trimesters. Only 20% do not take any sick leave.
Duan et al. (2022)	China	Survey (longitudinal)	Women who are pregnant (55) and who are not pregnant (74)	Performance in this study refers to completing work assignments on time and meeting the supervisor's expectations. Pregnancy increases the tendency to engage in impression management compared to non-pregnancy, suggesting that women make more effort to maintain their professional

				image. Higher impression management predicts higher **work performance**. Support from managers weakens the link between pregnancy and impression management.
Gatrell (2011a)	United Kingdom	Interview	Women who were either pregnant at the time of the interview or mothers of at least one toddler-aged child (15)	Women experience pressure to appear healthy and reliable, regardless of their actual physical or mental condition. As a result, some women continue to work despite serious health problems. Examples include women who return to work the day after a miscarriage without informing their colleagues, or women who continue to work despite persistent morning sickness and vomiting. This behaviour leads to **presenteeism**.
Gutke et al. (2014)	Sweden and Norway	Survey (longitudinal)	Pregnant women (898)	Lower back pain and pelvic pain during pregnancy can lead to sick leave and thus cause **absenteeism**. The severity of the pain is linked to the amount of sick leave taken.
Nakamura et al. (2022)	Japan	Survey	Women aged between 20 and 40 who are pregnant (450) and who are not pregnant (454) (as a control group)	**Absenteeism**, measured in terms of the number of days absent due to physical or mental health problems and pregnancy symptoms, is significantly higher among pregnant women than among non-pregnant women. Pregnant women also experience greater loss of productivity at work, as measured by the Work Limitations Questionnaire (impact on **work performance**).
Pedersen et al. (2021)	Denmark	Survey	Pregnant women (910)	Almost 15% of pregnant women report **absenteeism** of two weeks or longer around the 27th week of pregnancy. Women who are exposed to risk factors at work are at increased risk of long-term sick leave.
Stafne et al. (2019)	Norway	Survey (longitudinal)	Women aged 18 or older who are pregnant with their first child, except for high-risk pregnancies (716)	Approximately 75% of women report low back and pelvic pain and more than a quarter report sick leave as a result. Women with pelvic pain are two to three times more likely to take sick leave than women without pain. The more severe the functional limitation, the greater the likelihood of **absenteeism**.
Truong et al. (2017)	Norway	Survey	Women who are pregnant or mothers of a child younger than 1 year old (6686)	Half of women report taking sick leave during pregnancy, which leads to **absenteeism**.
Villar et al. (2019)	Spain	Interview	Women who were pregnant between 2010 and 2014 and worked in a healthcare institution (428)	Approximately 32% of women are absent due to sick leave, while 28.3% are covered by pregnancy occupational risk. The remaining 39.9% report only limited **absenteeism**.
Wada et al. (2021)	Japan	Survey	Women aged between 20 and 44 who are pregnant for the first time, are at least 10 weeks pregnant, and are not yet on maternity leave (450)	The impact on **work performance** is linked to work stress (heavy workload and unsuitable tasks), pregnancy symptoms, how far along the pregnancy is and how pregnancy is handled at work (company culture, openness, and discrimination). **Absenteeism** is mostly linked to pregnancy complications (physical health issues).
C. MENOPAUSE				
Adelekan-Kamara et al. (2023)	United Kingdom	Interview	Female doctors in menopause (21) and doctors not in menopause (20) (including 14 men)	Menopause symptoms have an impact on doctors' **work performance**. A strong sense of duty and the fear that their absence will increase workload for their coworkers lead to **presenteeism**. The lack of flexible working conditions and formal support measures also increases the risk of **absenteeism**.
Beck et al. (2020)	United Kingdom	Survey	Individuals (8% of participants does not identify as cisgender woman) (5399)	Symptoms of menopause negatively affect work productivity (impact on **work performance**). Persistent symptoms lead to **absenteeism** in the long term.
Bolge et al. (2010)	United States	Survey	Women aged 18 years or older who are experiencing menopausal symptoms (5781)	Women with insomnia due to menopause are 17.3% more likely to experience productivity impairment and 16.1% greater overall work productivity impairment compared to women without insomnia (impact on **work performance**).

Cronin et al. (2023)	England, Finland, Denmark, New Zealand, Australia, and United States	Interview	Women aged 45 or older, employed as nurses (48)	Menopause symptoms have a negative impact on **work performance**. Women experience sleep deprivation due to night-time hot flushes and concentration problems at work, causing them to worry about making mistakes. In addition, physical complaints make patient care extra difficult.
Faubion et al. (2023)	United States	Survey	Women aged between 45 and 60 who are professionally active (4440)	One in ten women report absence from work (average 3 days), and 6% report working fewer hours. More severe menopausal symptoms are clearly more often associated with negative work outcomes, such as **absenteeism** and lost work productivity (impact on **work performance)**.
Gartoulla et al. (2016)	Australia	Survey	Women aged between 40 and 65 (1263)	Menopausal vasomotor symptoms are associated with poorer self-assessed work ability, as measured using the Work Ability Index, including indicators related to **work performance** and **absenteeism**.
Geukes et al. (2012)	The Netherlands	Survey	Women aged between 44 and 60 (208)	There is a significant negative correlation between menopausal symptoms and work ability (measured using the Work Ability Index, including indicators related to **work performance** and **absenteeism**).
Geukes et al. (2016)	The Netherlands	Survey	Women aged between 44 and 60 with symptoms who had not yet received medical treatment and visited a menopause clinic (60) and a control group of healthy women without symptoms (205)	Women with severe menopausal symptoms are 8.4 times more likely to report lower work ability (according to the Work Ability Index, including indicators related to **work performance** and **absenteeism**) than women without diagnosed menopausal complaints.
Gottardello and Steffan (2024)	United Kingdom	Interview	Women over the age of 40 who are experiencing or have already experienced menopausal symptoms and describe themselves as neurodivergent (43)	A combination of menopause and neurodivergence can lead to increased concentration problems, memory loss, and challenges in decision-making. The women report a negative impact on their work, but this is mainly on their subjective work experience and not always on their **work performance**.
Griffiths et al. (2013)	United Kingdom	Survey	Women aged between 45 and 55 (896)	One-third of women feel that their menopausal symptoms have a negative impact on their **work performance**.
Guidetti et al. (2022)	Italy	Survey	Women in menopause who work in social services (204)	Only physical menopausal symptoms appear to be directly and significantly related to **presenteeism**; vasomotor and psychosocial symptoms are not. Physical workload indirectly influences **presenteeism** via physical menopausal symptoms.
Hammam et al. (2012)	Egypt	Survey and interview	Women aged between 45 and 60 (131)	Menopausal symptoms have a negative impact on work capacity and **work performance**.
Hickey et al. (2017)	Australia	Survey	Women over 40 years of age (41% of whom are nurses) (1092)	Almost a third of women say they often make mistakes at work due to the menopause. Fatigue plays a particularly significant role in this, as it leads to poorer **work performance**, worse memory, worse concentration, and increased forgetfulness.
Hobson and Dennis (2024)	United Kingdom	Focus group (longitudinal)	Women with symptoms of (peri/post) menopause (14)	Women report difficulty remembering things, notice that their attention to detail is declining and find hot flushes difficult to cope with. These symptoms affect their productivity and **work performance**. Some find working from home during the coronavirus pandemic to be a positive experience, as it helps them to better manage their symptoms.
Humeniuk et al. (2019)	Poland	Survey	Women aged between 45 and 60 who work in non-manual employment (287)	The severity of menopausal symptoms is negatively correlated with work ability (according to the Work Ability Index, including indicators related to **work performance** and **absenteeism**) in late

				perimenopausal and postmenopausal women. There is no correlation in early perimenopausal women.
Ishimaru et al. (2023)	Japan	Survey	Women aged between 40 and 59 (4000)	Women with severe menopausal symptoms are twelve times more likely to experience **presenteeism** than women without symptoms. When the symptoms are considered separately, only the psychological menopausal symptoms appear to have a significant effect on reduced work performance (physical and urogenital symptoms are not significant).
Olajubu et al. (2017)	Nigeria	Survey	Women aged 45 or older who have not had a menstrual period in the past 12 months (200)	Menopause is negatively correlated with the results of the Work Ability Score (related to **work performance**).
Oude Hengel et al. (2023)	The Netherlands	Survey	Dutch female workers aged between 40 and 67 (4010)	Approximately 80% of women in perimenopause experience symptoms, which is associated with reduced work ability, according to the Work Ability Index (including indicators related to **work performance** and **absenteeism**).
O'Neill et al. (2023)	Ireland	Survey	Women who work at the university hospital and who, at the time of the survey, were experiencing menopausal symptoms or had already gone through the menopause. (407)	65% of women say that their symptoms affect their **work performance** and 18% take sick leave (**absenteeism**) as a result. The more severe the symptoms, the greater the impact on their performance. Symptoms cause them to be less able to focus, less efficient, and less confident in their work.
Saarinen et al. (2024)	Finland	Survey	Women in menopause (359) and not in menopause (2302)	Women experiencing menopausal symptoms are 1.5 times more likely to report poor perceived work ability (measured using the Work Ability Score, related to **work performance**) than women without menopausal symptoms.
Steffan and Potočnik (2023)	United Kingdom	Interview	Employed women over the age of 47 (21)	Women acknowledge that menopause symptoms have a clear negative impact on their **work performance**, both in reality and in how they perceive their own performance.
Steffan and Potočnik (2023)	United Kingdom	Survey	Women (142)	Women experience both physical and psychological menopause symptoms that negatively affect their **work performance**, with the severity of the symptoms playing a clear role. Support from colleagues and managers, as well as the use of coping strategies, can partially alleviate this impact.
Vincent et al. (2024)	Australia	Interview	Women aged between 28 and 51, in early menopause (30)	Women report that menopausal symptoms have a negative impact on their **work performance**. The degree of impact varies depending on the job. Women in positions involving direct customer contact are concerned about the visibility of symptoms such as hot flushes, while women in positions such as researchers and analysts are concerned about reduced concentration.
Willman and King (2023)	United Kingdom	Survey	Women aged 40 or over who work for the UK Armed Forces (607)	Fifty percent of women report that symptoms have a negative impact on their work productivity (impact on **work performance**).

Notes. 1) The following abbreviations are used: PMS (premenstrual syndrome) and PMDD (premenstrual dysphoric disorder). 2) When an article reported multiple independent studies (e.g., separate experiments using different designs and samples), each study was treated as a separate unit of analysis and data were extracted accordingly. Accordingly, 57 articles were included; the final dataset consisted of 58 studies. 3) The research method of all included studies is cross-sectional unless otherwise stated. 4) Although students were excluded based on the inclusion criteria, studies including mixed samples of students and working women were retained when results were reported jointly and the majority of participants were employed women. Similarly, although the review focuses on women, studies including both cisgender women and individuals who do not identify as women were included, provided that participants experienced symptoms related to menstruation, maternity, or menopause and that cisgender women constituted the majority of the sample. This approach was adopted to maximise inclusiveness while maintaining relevance to the target population. 5) The Work Ability Index includes seven domains: current work ability, work ability in relation to physical and mental job demands, number of diagnosed health conditions, work impairment due to illness, sickness absence, expected future work ability, and mental resources (Gartoulla et al., 2016). The Work Ability Score is a single-item measure of perceived work ability in which respondents rate their current work ability relative to their lifetime best on a scale from 0 to 10 (Saarinen et al., 2024).

Figures

Figure 1. PRISMA flowchart following Page et al. (2021)

